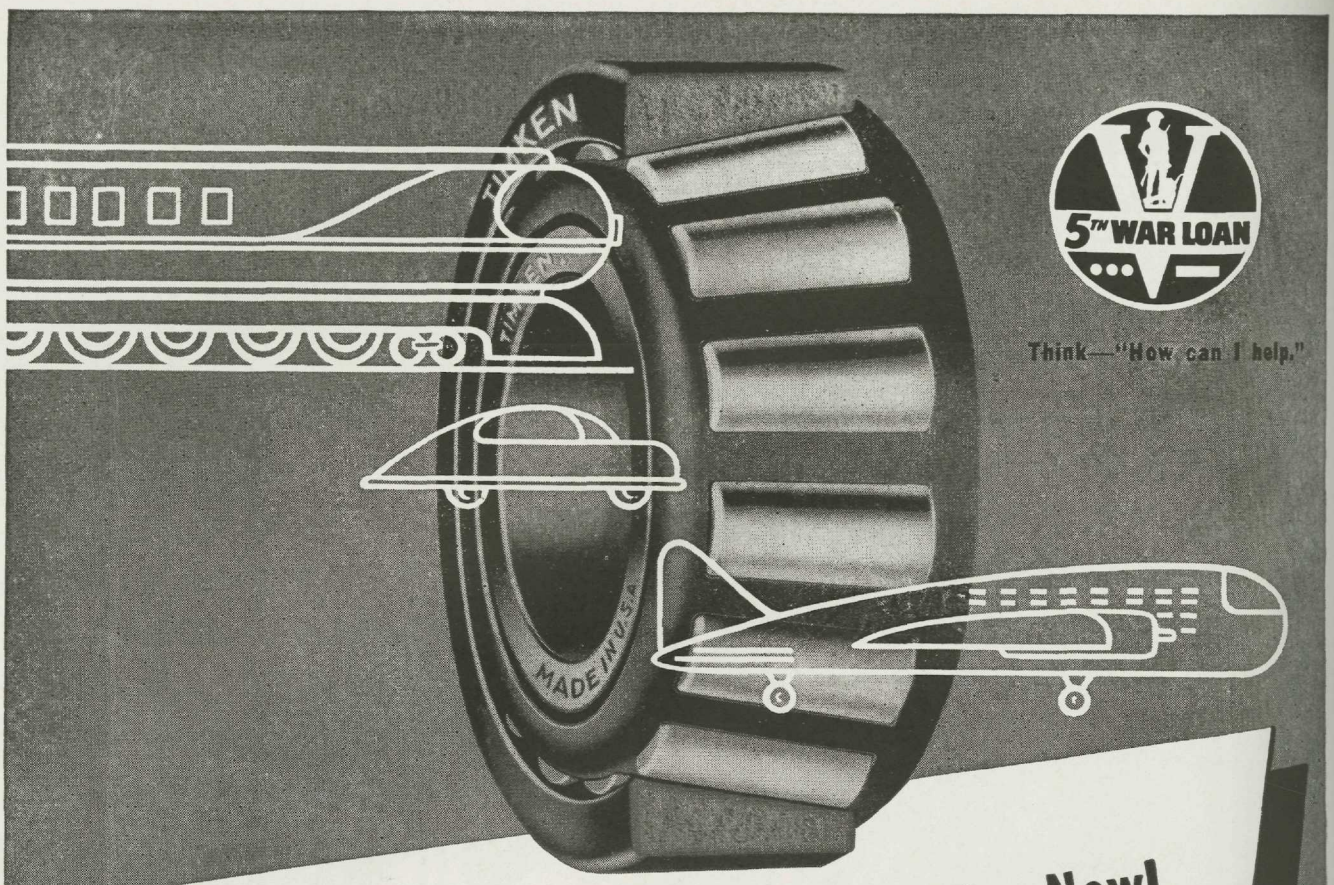
OHIO STATE ENGINEER

• JUNE •

1914

Price 15 Cents



5TH WAR LOAN

Think—"How can I help."

Prepare for Future Responsibilities Now!

LEARN TO KNOW YOUR BEARINGS

The post-war world will be mechanized to an extent that cannot be completely foreseen now. Wheels and wings will play a greater and more important part in the world of the future than ever before—and so, consequently will bearings.

In view of the present dominant position of Timken Tapered Roller Bearings, it is not too much to say that these bearings will figure still more importantly in future mechanical developments; for there are few bearing requirements that Timken Bearings cannot meet.

So while you still are studying, it will pay you to learn to know Timken Bearings thoroughly—their design, application, and potentialities. Then you'll be still better equipped for your job when college days are over and you begin your career as a full-fledged engineer. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

KEEPING UP WITH

Electricity

BACK ON THE JOB after a 25-year layoff are the original Westinghouse generators at Niagara Falls. These went into service in 1895 as part of the first great a-c polyphase power system. Replaced in 1917, they were kept as standby equipment until the beginning of the present war. Rewound and reconditioned, they are now back in full-time service, delivering *more* power than when new.

LIGHTS FOR HEAVYWEIGHTS. Those new super-bombers we've been reading about brought trouble on landing fields. Contact lights, sunk in the concrete runways, weren't built to stand the weight, so structural strength had to be increased to 200,000 pounds, without any change in dimensions. As late as 1942, 35,000 pounds was standard.

SIX-ROOM TRANSFORMERS—rather transformers as large as a six-room house are now serving a new war industry. They're rated at 75,000 kva each, and require 188 tons of steel, 130 miles of copper wire. Separately-mounted radiators, and use of Hipersil for cores kept down size and weight. Otherwise, say engineers, problems of shipment and installation would have been insuperable.

"MAKE WAY FOR A SAILOR" may be the new slogan in locomotives. Steam turbines, so efficient in ship propulsion, are being adapted for railroad use. Tests of one Westinghouse experimental 6,500 hp unit indicate a saving of one-fourth in steam required, compared to conventional reciprocating engines of the same power.

INSPECTING THE INVISIBLE. Tiny pinholes, invisible to the naked eye, mean defective tin plate and possible spoilage of badly needed food. A Westinghouse photoelectric device detects these defects every time, though the tin plate rolls past at 1,000 feet a minute. Flawed sections are automatically marked, to be later cut and removed.

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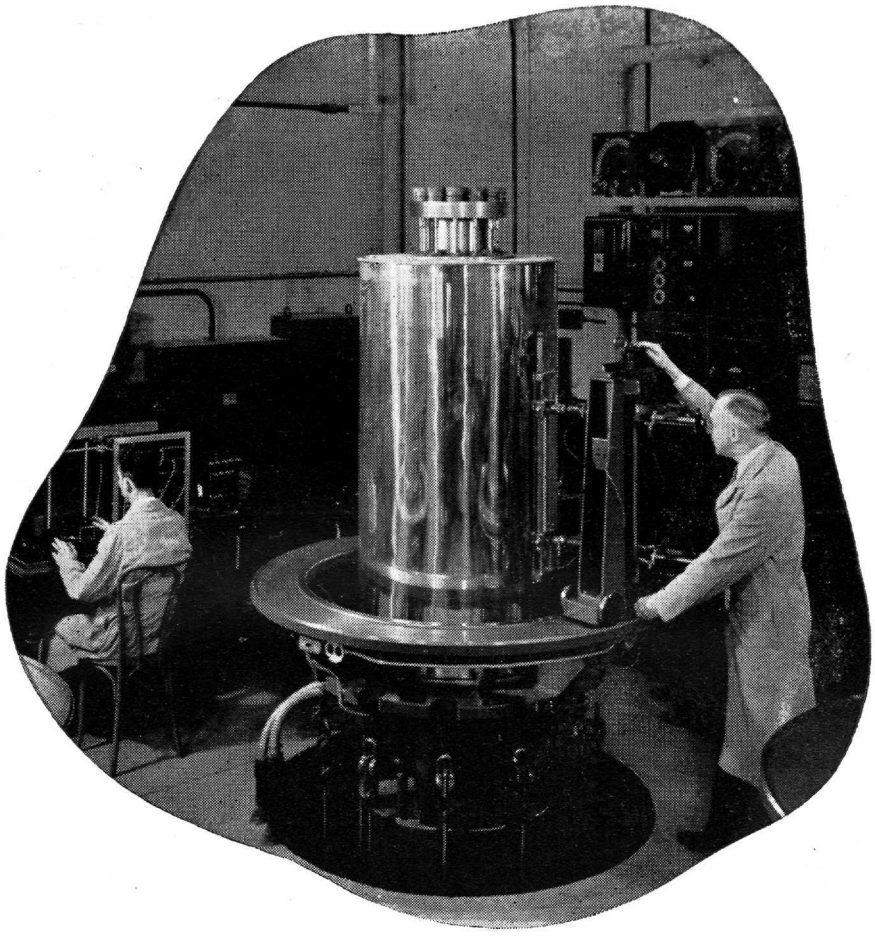
The above items are condensed excerpts from articles in the WESTINGHOUSE ENGINEER, a bi-monthly engineering review. Regular subscription price—$2.00 a year. *Special price to students—50¢.*



Research behind gas turbines

The known simplicity and theoretical efficiency of the gas turbine has challenged generations of engineers. But the gas turbine as a *practical producer of power* could not exist until new alloys were created—alloys which could withstand high temperatures for long periods.

In the testing machine shown here, Westinghouse scientists tested alloys, subjecting them to stresses of thousands of pounds per square inch at temperatures as high as 1,000 degrees Fahrenheit. This was the research that provided better materials for steam turbines.

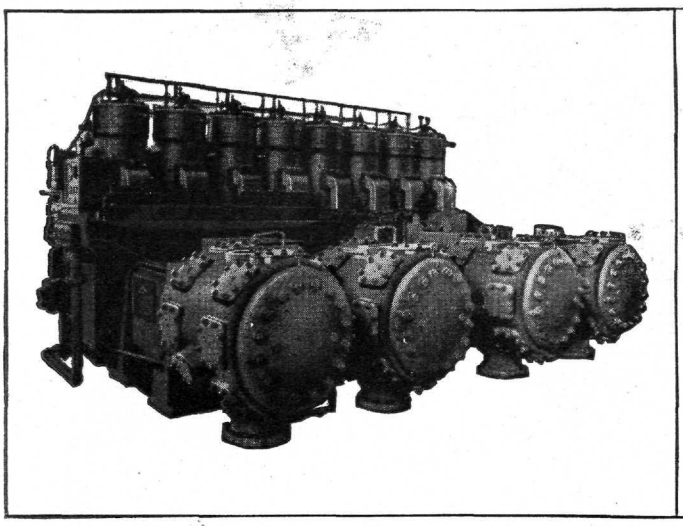
It was also an important step toward gas turbines. As the work continued, with new alloys and new testing machines, positive results were obtained at the high temperatures required for efficient gas turbine operation. *Thus, research developed the materials which make the gas turbine a practical possibility.*

Another example of the Westinghouse research that is constantly providing new tools for industry. Westinghouse Electric & Manufacturing Co., Pittsburgh 30, Pennsylvania.

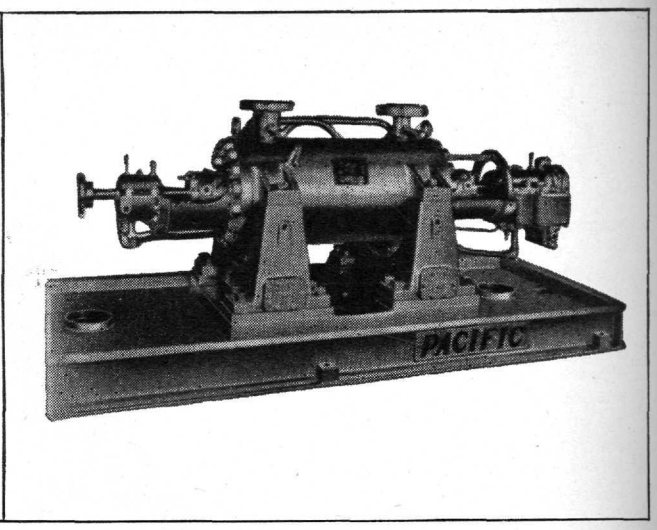
WESTINGHOUSE PRESENTS: *John Charles Thomas, Sun. 2:30 p.m., EWT, NBC. "Top of the Evening," Mon. Wed. Fri. 10:15 p.m., EWT, Blue Network.*

Westinghouse

PLANTS IN 25 CITIES OFFICES EVERYWHERE



CLARK 8 Cyl. 800 B. H. P.
GAS ENGINE DRIVEN COMPRESSOR



Pacific Type ITB—Hot Oil, Multi-Stage Horizontal, Forged Steel Shell, Double-Case, High Pressure Centrifugal Pump.

Achievements in the Field

Half of Clark Bros. 64-year history has been largely devoted to developing and perfecting the "2 Cycle" Engine. Clark engineers, with far-sighted vision, recognized "2 Cycle" as the ultimate engine as long ago as 1910. Years of successful experiment and research produced the modern Clark "2 Cycle."

No greater tribute could be paid Clark for the hard pioneering years, than the wide acceptance Clark "2 Cycle" enjoys today, not only throughout the Petroleum Industry, but in many of the world's largest war industries such as Synthetic Rubber, Synthetic Ammonia and Toluene plants.

Illustrated above is the Clark 8 cylinder—800 B. H. P.—"2 Cycle" Gas Engine Driven Compressor. Because of its notable records in outstanding Recycling and Pressure Maintenance plant, petroleum engineers consider it "standard equipment."

Twenty years ago Pacific Engineers, in a modest little pump shop, startled the world with a radically new oil pumping technique. In those days oil pumps were costly and unreliable. They either ground themselves to uselessness in a few months or corrosion did the trick.

So these alert Pacific engineers took the micrometer, new alloys, finest of materials and developed new engineering methods. They created a group of precision pumps that defied all oil field and refinery pumping conditions—pumps of efficiency and economy with a life measured in years instead of months.

Today—in a large modern plant—Pacific still maintains its leadership with a complete line of centrifugal, turbine and plunger types of precision pumps for water well, oil well, refinery, pipeline, process, boiler feed and hot oil operations, as well as large emulsion pumps for synthetic rubber plants.

CLARK BROS. CO., INC.
Olean, N. Y.

PACIFIC PUMPWORKS
5715 Bickett St., Huntington Pk., Cal.

"Two of the Dresser Industries"

FOR SPEEDIER TRANSPORTATION—MAGNESIUM WILL PERMIT NEW LOW COSTS AND INCREASED PAY LOADS

Do you know what "the Metal of Motion" really means? If you picked up a ten-foot bar of Magnesium just once you would know. What you expect to be relatively heavy is astonishingly light. Magnesium is, in fact, a full third lighter than aluminum—yet strong and durable.

Magnesium is the lightweight champion of the mighty Allied air fleets today. You will soon come to recognize it in sleek streamliners and soaring air transports. For with Magnesium, designers are now planning to cast off the anchor of dead weight. In its place will appear greater fuel capacity to increase range and speed—larger cargo space to increase pay loads. Operating efficiency will go up—operating costs will go down—and the *things that move* will "lighten up" with Magnesium.

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

New York • Boston • Washington • Philadelphia • Cleveland • Detroit • Chicago
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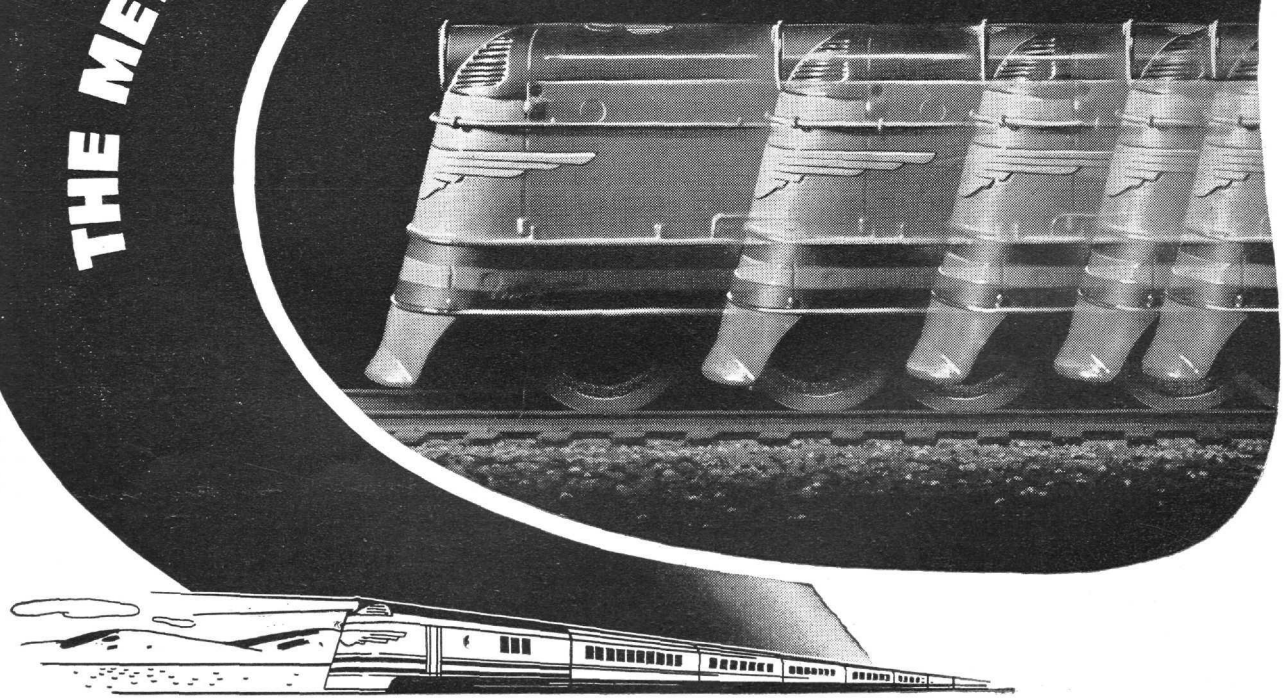
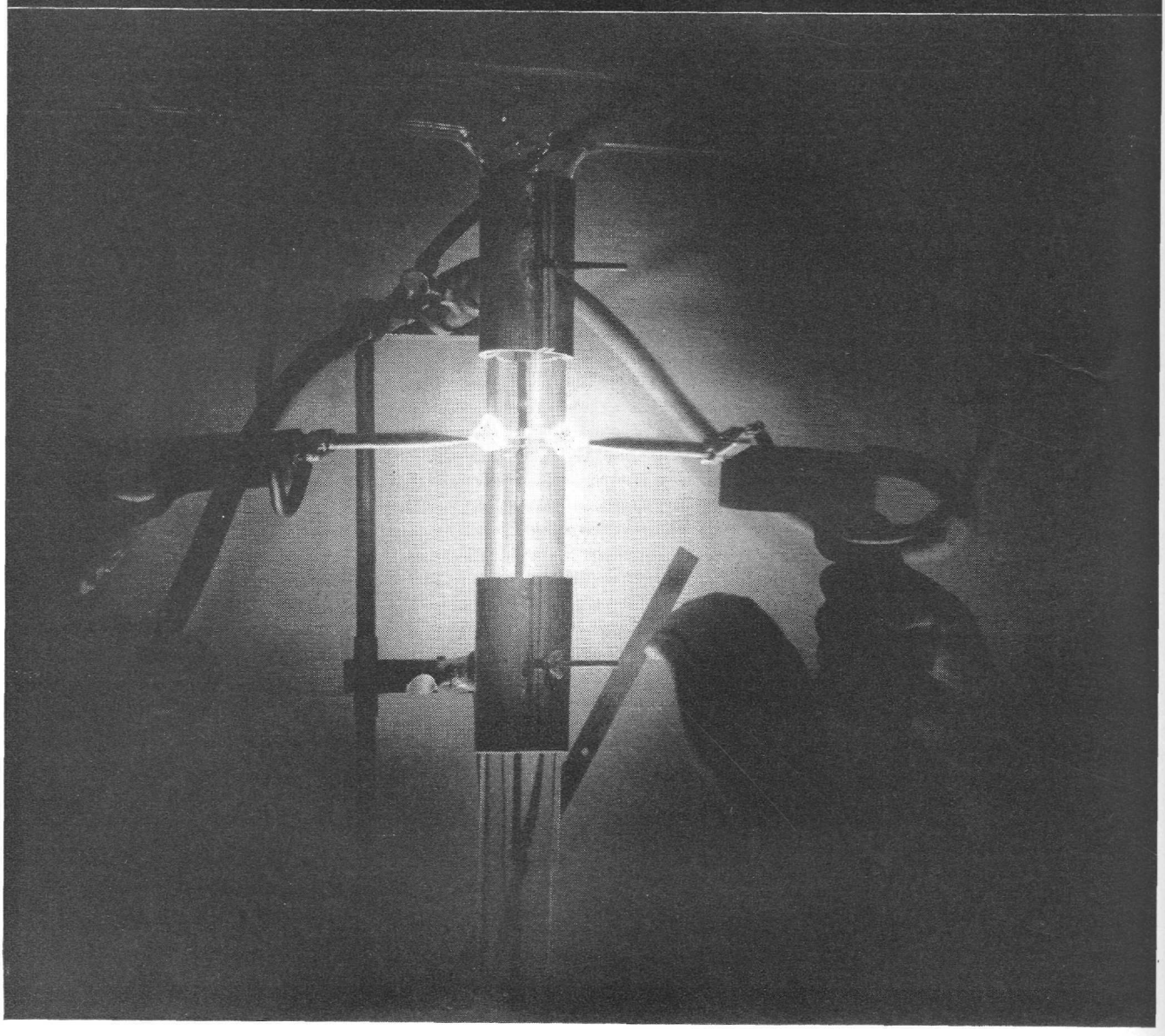
DOW magnesium

DOWMETAL

THE METAL OF MOTION



Sewing glass with a thread of fire...



FOR a long time industry has wanted a method by which two or a thousand pieces of glass pipe could be joined into a continuous piece. Corning has worked out a high-frequency electrical welding process that literally sews glass with fire.

It has these advantages: 1) It's faster than old methods. 2) It makes a smooth, transparent joint, just as strong as the pipe itself. 3) With the new portable welding equipment it may soon be possible to go into a food or chemical plant and install continuous glass piping right on the job.

Welded glass pipe isn't available now except to certain war plants. But it's another interesting development that points to a greater use of glass when some of the present restrictions on production are behind us. Others are a new type of glass so resistant to thermal shock that it can be heated cherry red and then sprayed with ice water without breaking; "ribbon glass" in sheets almost as thin as cellophane; and a new method by which accurate shapes of almost any size or description never before possible in glass can be quickly formed. Glass is going to play a major role in post-war. And Corning will be there with what it has learned during the war plus a background of nearly a century of glassmaking experience. You can count on it. Glass, the material with a sparkling future, will keep full pace with your own sparkling future as an engineer. Corning Glass Works, Corning, N. Y.

CORNING
means
Research in Glass

The OHIO STATE ENGINEER

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O S E

Our Cover

Shipbuilding is one of many arc welding jobs today.

—Courtesy Westinghouse.

Our Frontispiece

This huge war plant is producing vital war materials needed in other war industries along with the finished war products.

—Courtesy General Electric.

EDWARD W. BAILEY, *Editor* **KENNETH C. LACY, *Bus. Mgr.***

Published in the months of November, December, February, March, April, May and June by the students in the College of Engineering, The Ohio State University, Columbus, Ohio. Subscription price, 97 cents (tax 3 cents) per year for seven copies. Single copies, 15 cents each. Make checks and money orders payable to THE OHIO STATE ENGINEER.

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Entered as second-class matter May 15, 1912, at the post office at Columbus, Ohio, under the Act of March 3, 1879. Acceptance for mailing at special rate postage provided for in Section 1103, Act of October 3, 1917. Authorized December 8, 1922